

A large, stylized blue flame graphic on the left side of the slide, composed of several curved, overlapping shapes that suggest the movement of fire.

Whether Trade at EU Hubs Adequately Reflects Gas Price for the Whole EU Gas Market?

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Contract Structuring and Price Formation Directorate
Gazprom Export

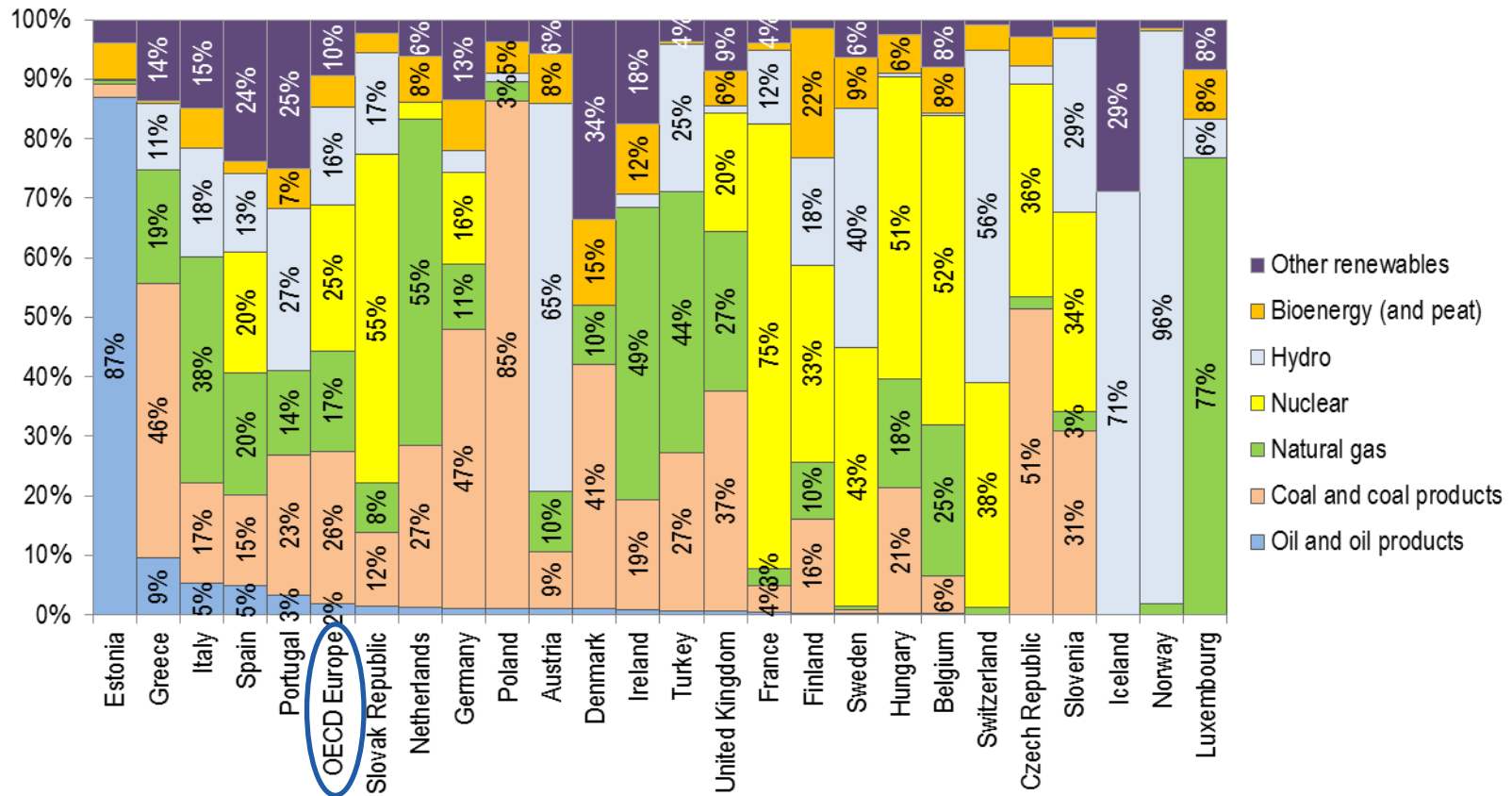
18th Meeting of the EU-Russia
GAC's Work Stream on Internal Market
Vienna, January 22, 2016

Questions to Cover

- Does rational for oil-indexation on the European market still holds?
- How volumetric flexibility makes hub and LTC prices different?
- Why hub prices are not an indication of the market equilibrium for the whole European market but only for the volumes not contracted under LTCs?

There is only Virtual Competition between Natural Gas and Oil Products in the OECD Europe Power Generation

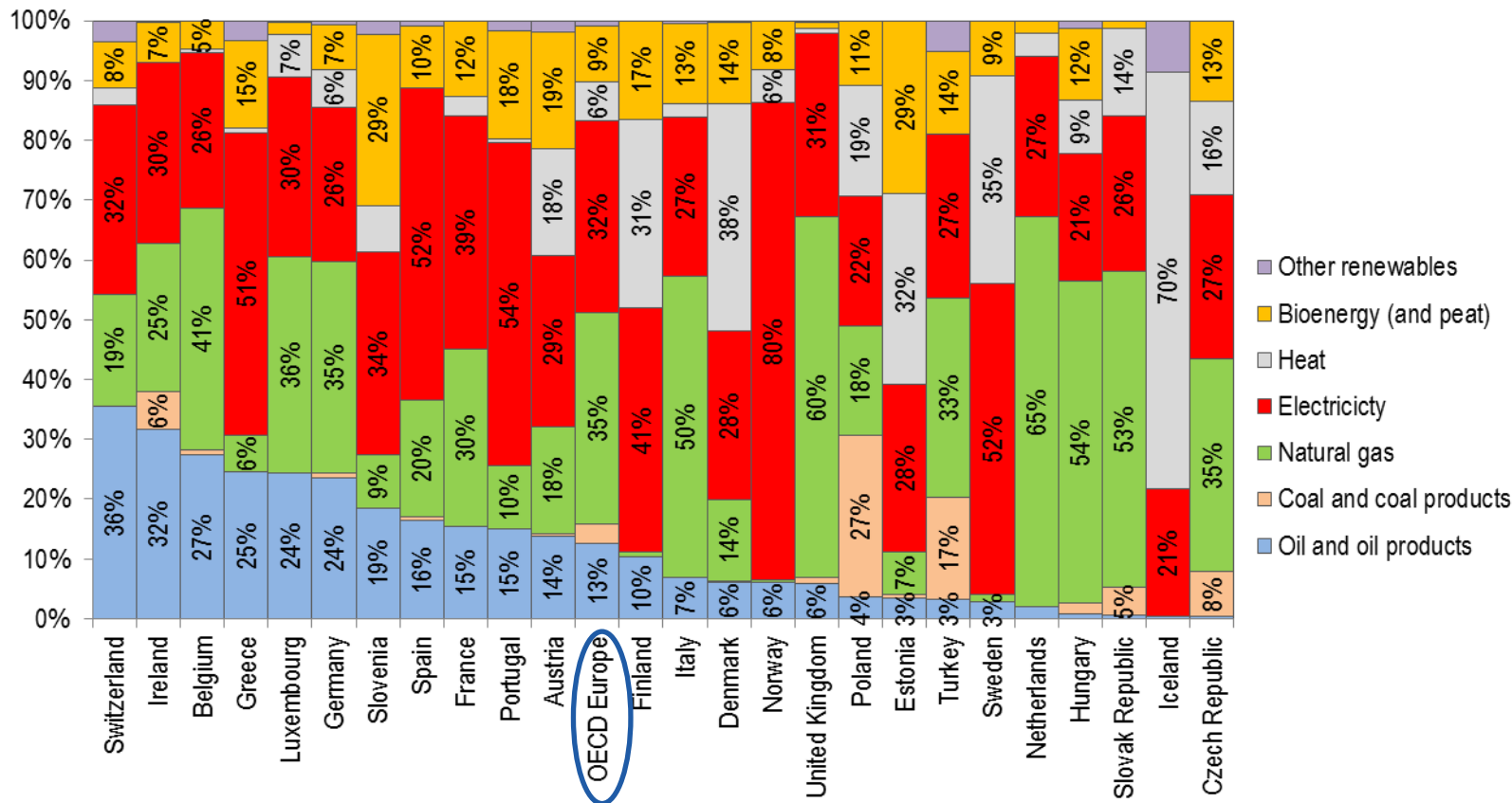
2013 Fuel Breakdown in Power Generation by Country (OECD Europe)



Source: IEA

There is Strong Competition between Natural Gas and Oil Products in Commercial and Residential Sector

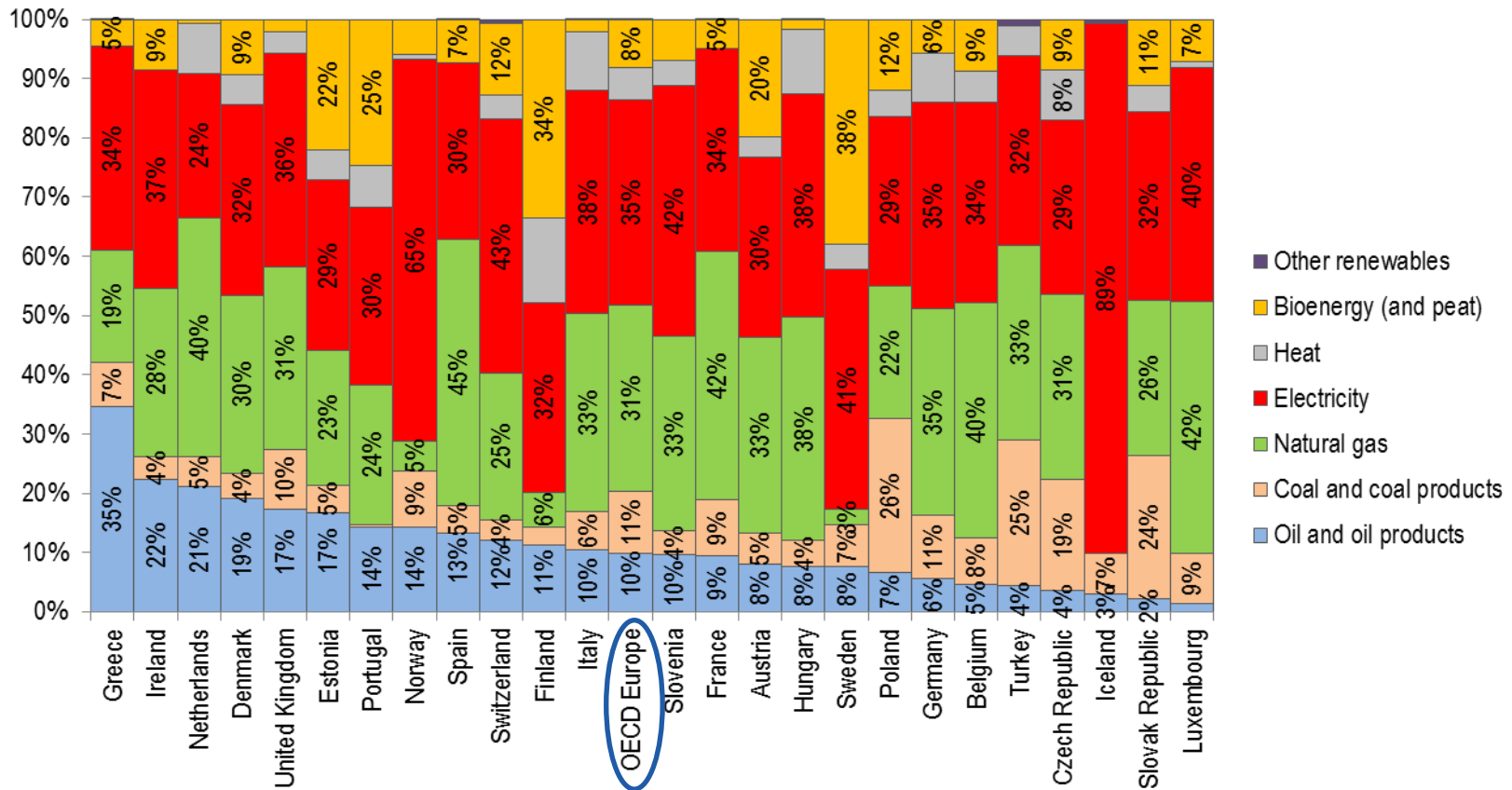
2013 Final Energy Consumption in Residential & Commercial Sector by Country (OECD Europe)



Source: IEA

There is Strong Competition between Natural Gas and Oil Products in Industry

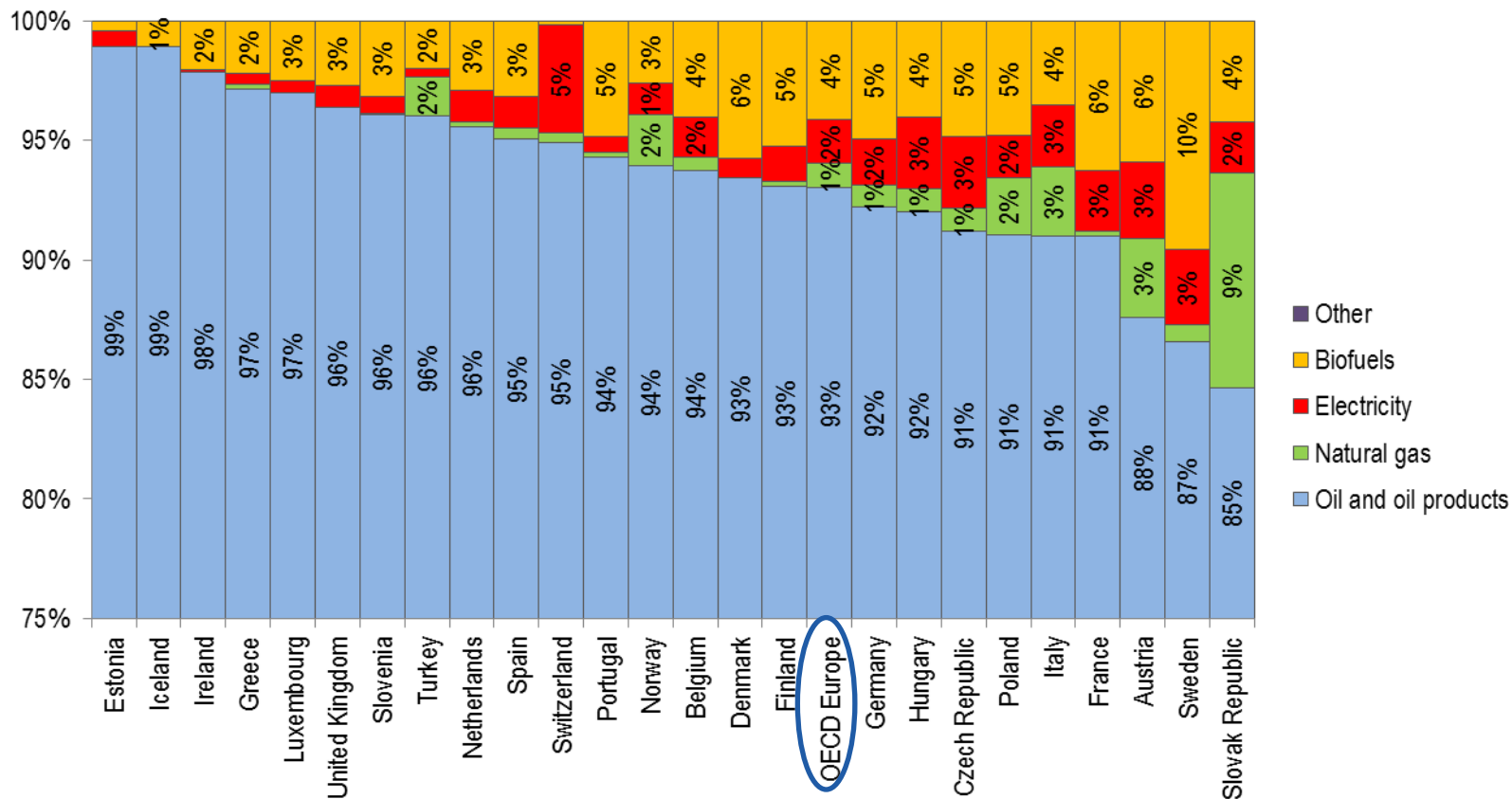
2013 Final Energy Consumption in Industry by Country (OECD Europe)



Source: IEA

Competition between Natural Gas and Oil Products is Emerging in Transportation Sector

2013 Final Energy Consumption in Transport Sector by Country (OECD Europe)



In ssLNG Projects Price Formulas Directly Link Natural Gas to Oil Products

Typical example: price formula in the MZA (LNG-fueled buses, Poland) project relates physical volumes of LNG to diesel:

$$A + 670,00 + 159,71 = 1,337 \times 50,00\% \times [(93\% G + 7\% F) \times K \times 0,845 + 1171,00 + 288,05 + 43,00 \times 1,065 \times 0,832]$$

which can be simplified to:

$$\begin{aligned} & \text{1kg LNG price (incl. excise and fuel tax)} \\ & = 66,85\% \times \text{dm}^3 \text{ diesel price} \end{aligned}$$

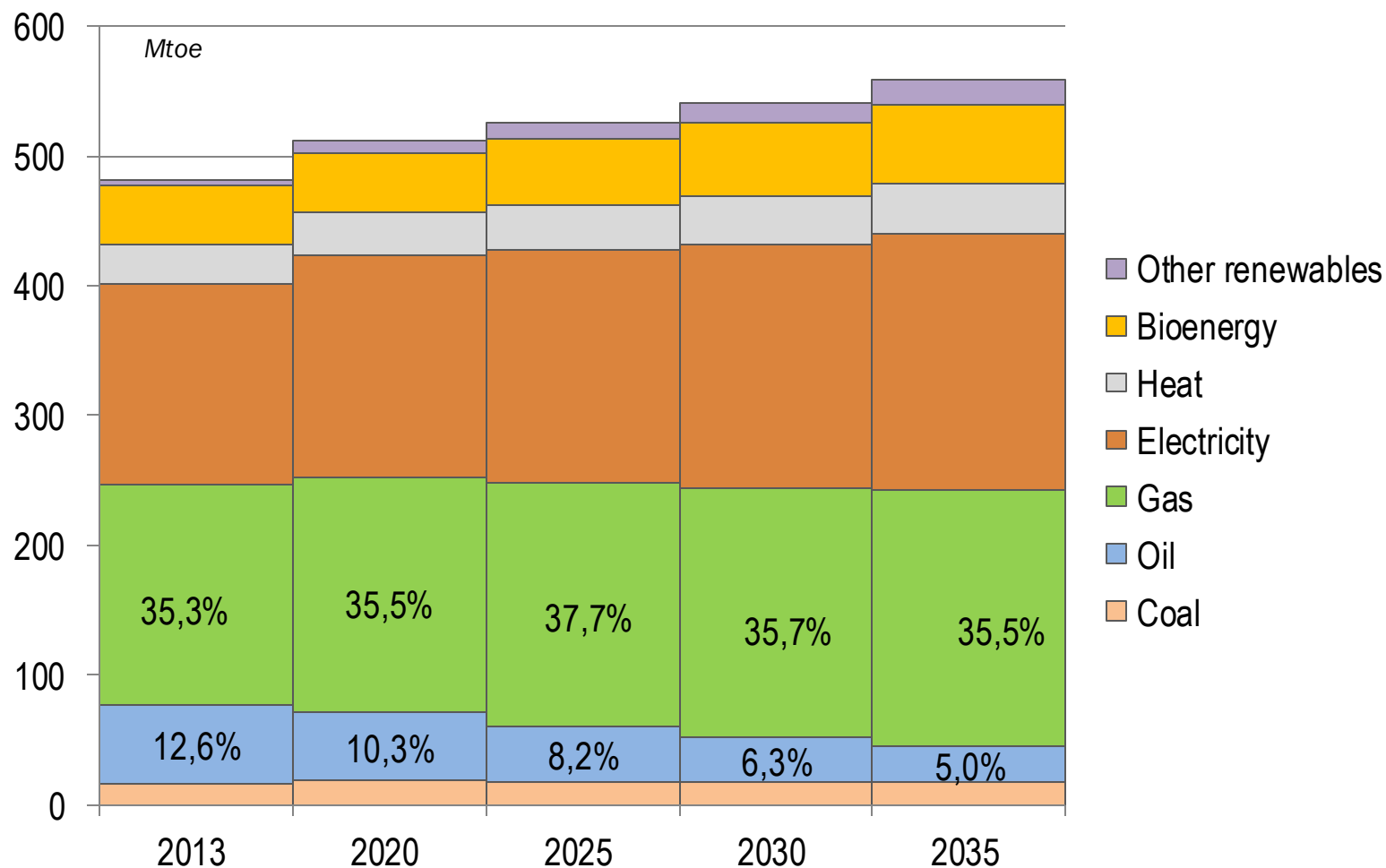
* The ratio between the prices LNG and diesel = 66,85% = 50% x 1,334 m³/kg (gas density of LNG)



Forecasts for LNG Demand in Bunkering is Gaining in Optimism, Emission Control Areas

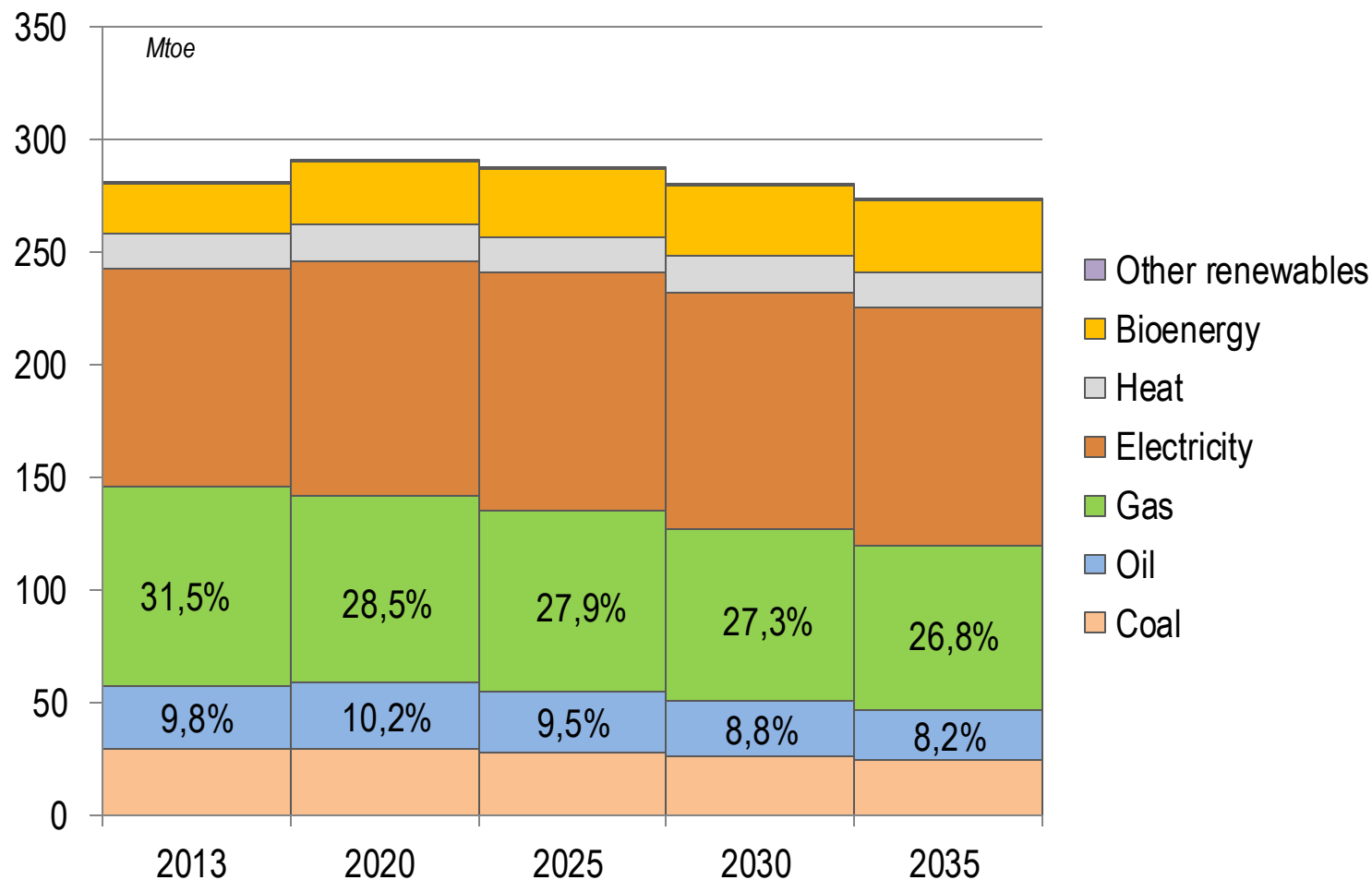
Company	Year	Demand forecast for 2025, mtpa
Lloyds	2012	Base case – 24.1, Low – 0.7, High – 69.6
Poten&Partners	2013	8.5
BCG	2015	89.0
Transparency Market Research	2016	24.5

Natural Gas and Oil will Remain Competing Fuels in the Foreseeable Future: Commercial and Residential Sector in OECD Europe



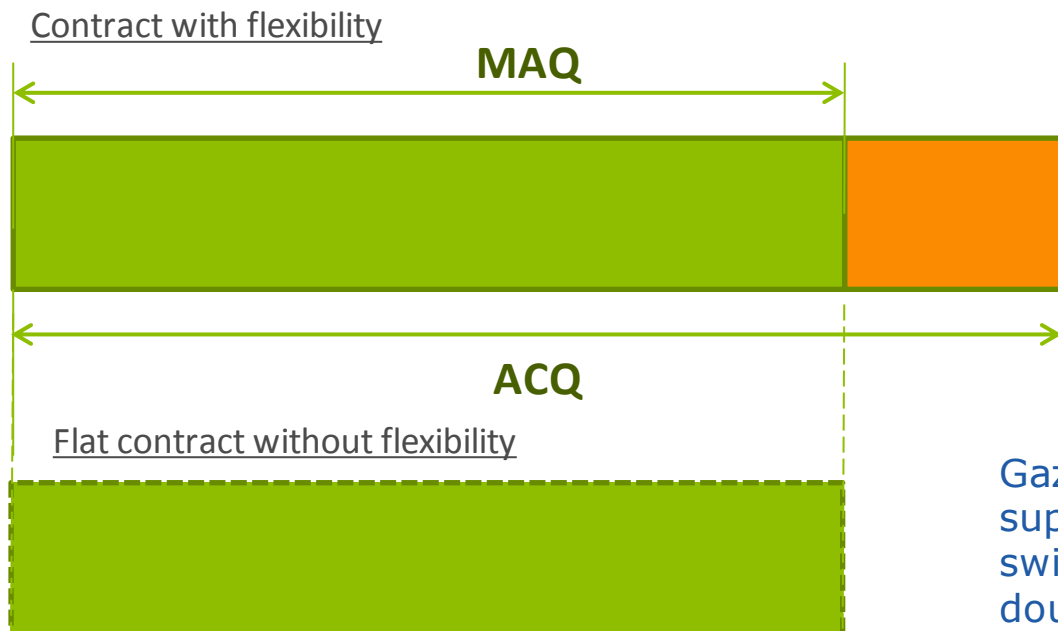
Source: IEA

Natural Gas and Oil will Remain Competing Fuels in the Foreseeable Future: Industry in OECD Europe

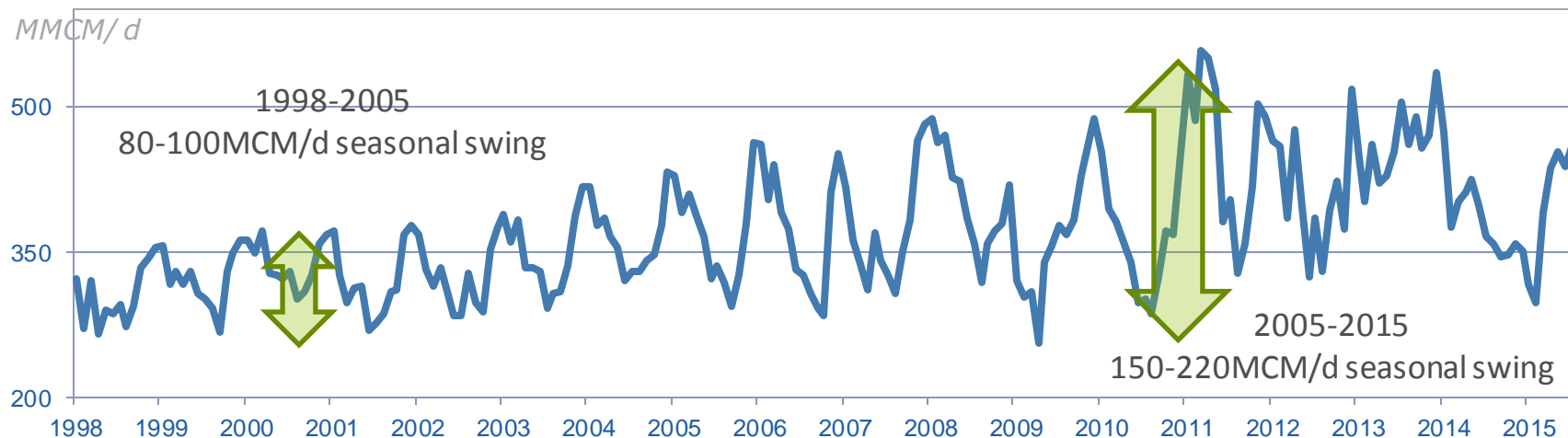


Source: IEA

LTCs with Flexibility are Premium Products Compared to Flat Products



Gazprom is the major provider of supply flexibility to Europe. Seasonal swing in Russian gas daily deliveries doubled over the last 20 years.



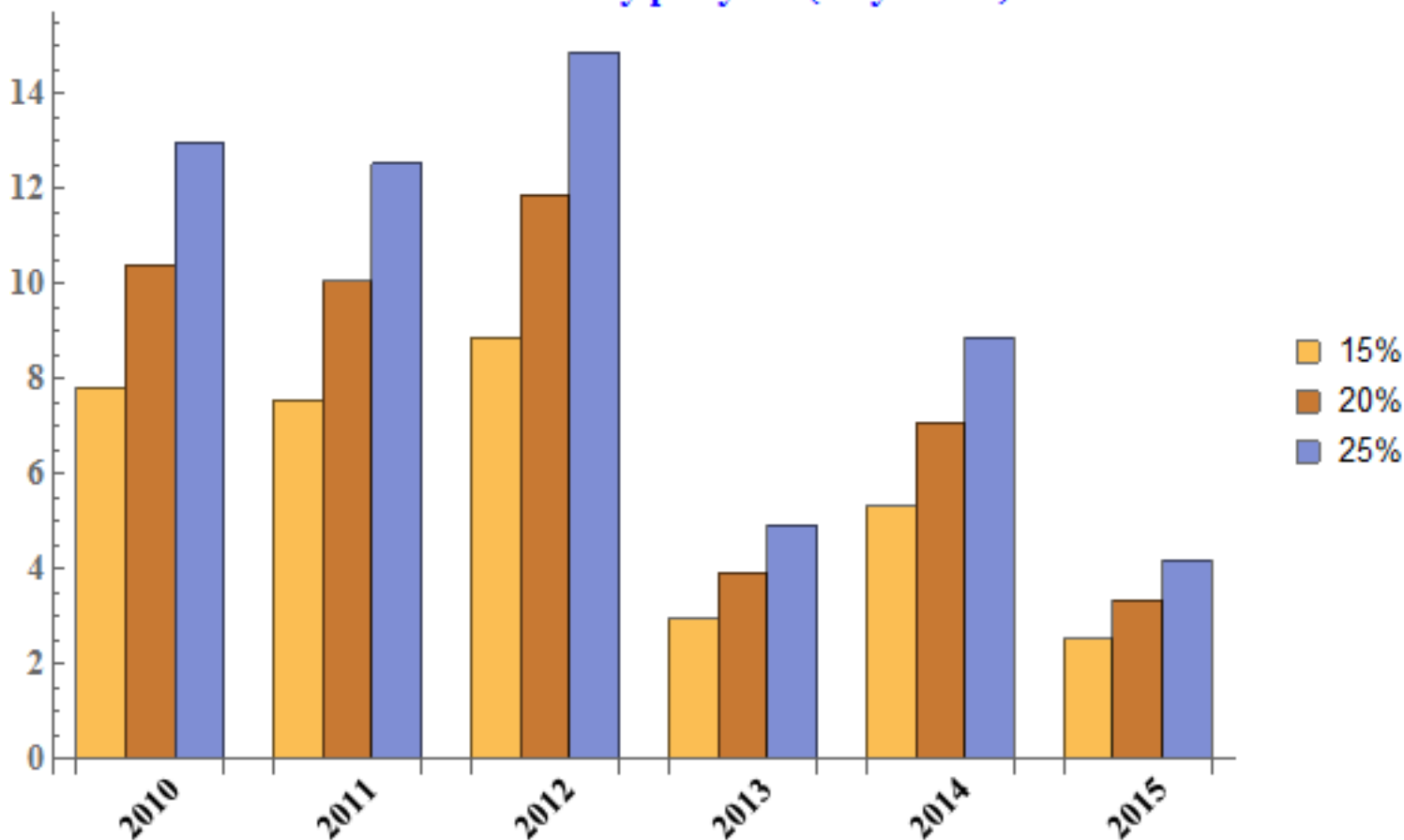
Recent Market Trends Affecting Value of Flexibility

Recent gas market trends (2012-2015)	Impact on flexibility premium
Arbitrage opportunities	↓
Cost of storage	↑
Seasonality in consumption	—
Seasonal spreads on hubs, forward and actual	↓
Midstreamers business model	↓
TOTAL	↓ ↓

Arbitrage Opportunities Emerge with Flexible LTCs: Potential Premium Size (1)

Euro/ mcm

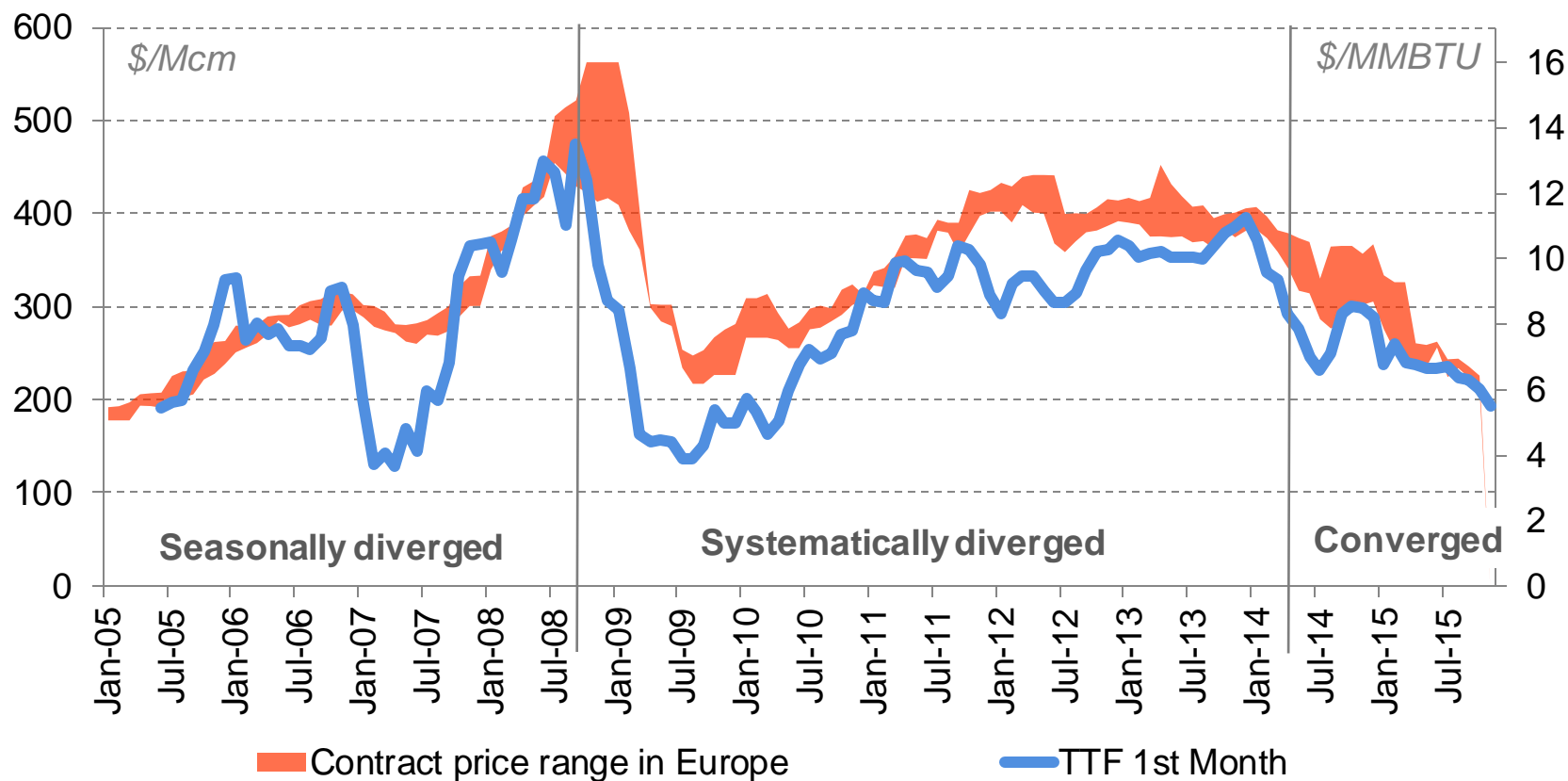
Premium vs. Flexibility per year (DayAhead)



Potential benefits of arbitrage depend on the share of flexible volumes and spread between hub and contract prices

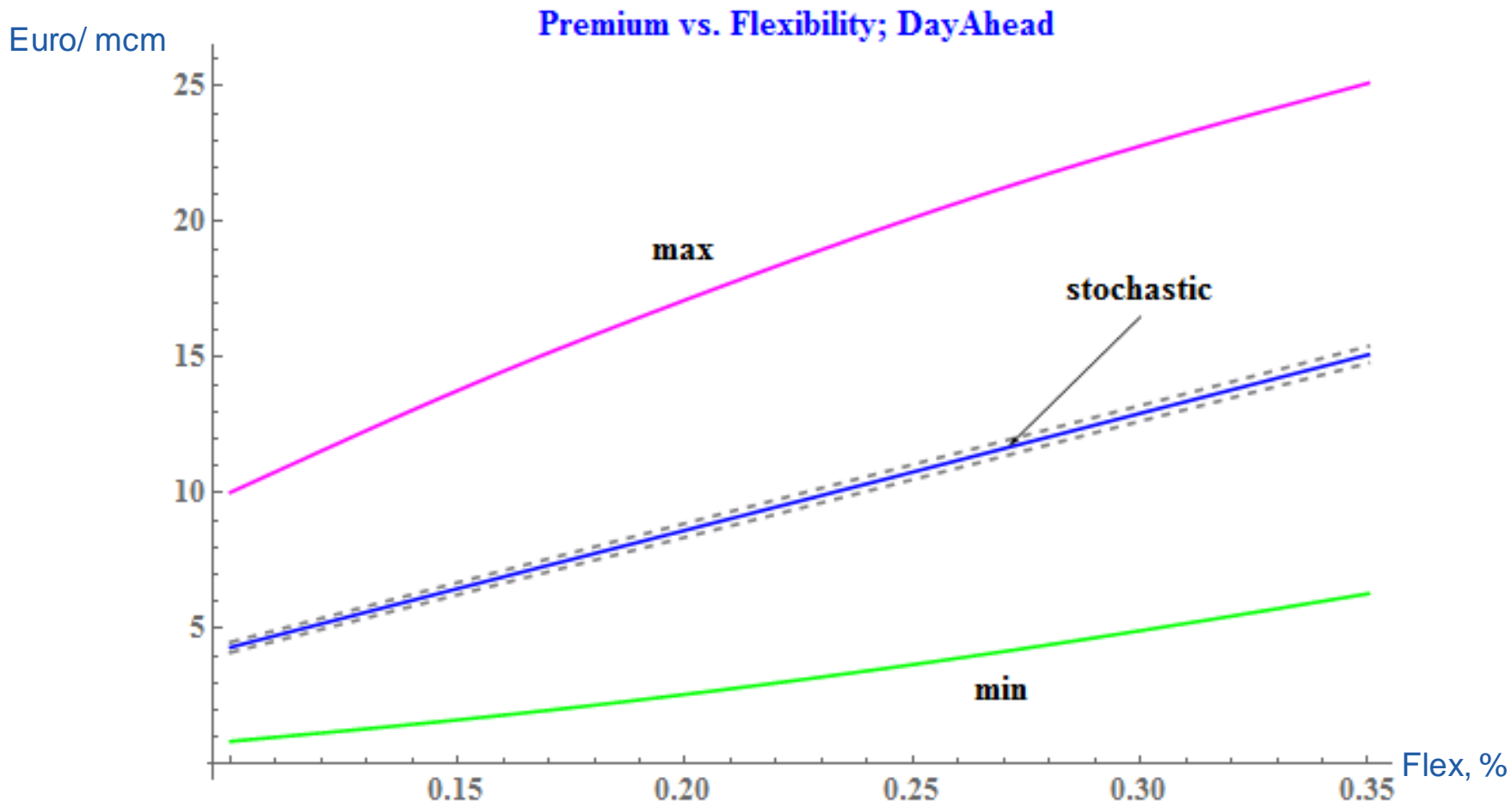
Source: Saint Petersburg State University of Economics

Arbitrage Opportunities Diminished as Contract and Hub-Prices Converged After Diverging in the Past (2)



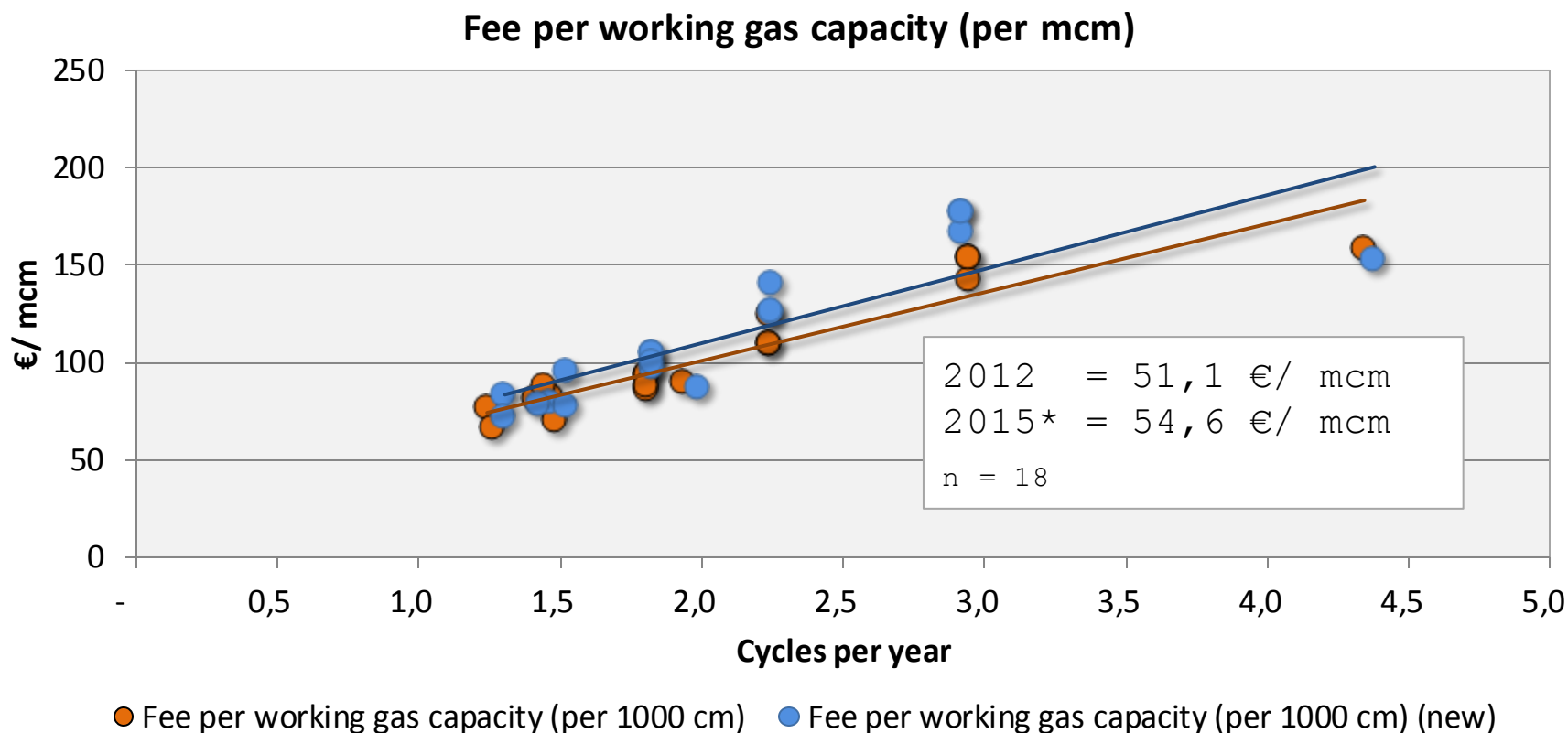
Contract- and hub-prices converged after seasonal (2005-2008) and systematical (2009-2014) diverging in the past years

Arbitrage Opportunities: Buyer always Wins (3)



Premium from arbitrage exists even in case of the least rational behavior of a buyer. Our estimate is based on its random choice, though this premium most likely resides between Max and Stochastic lines.

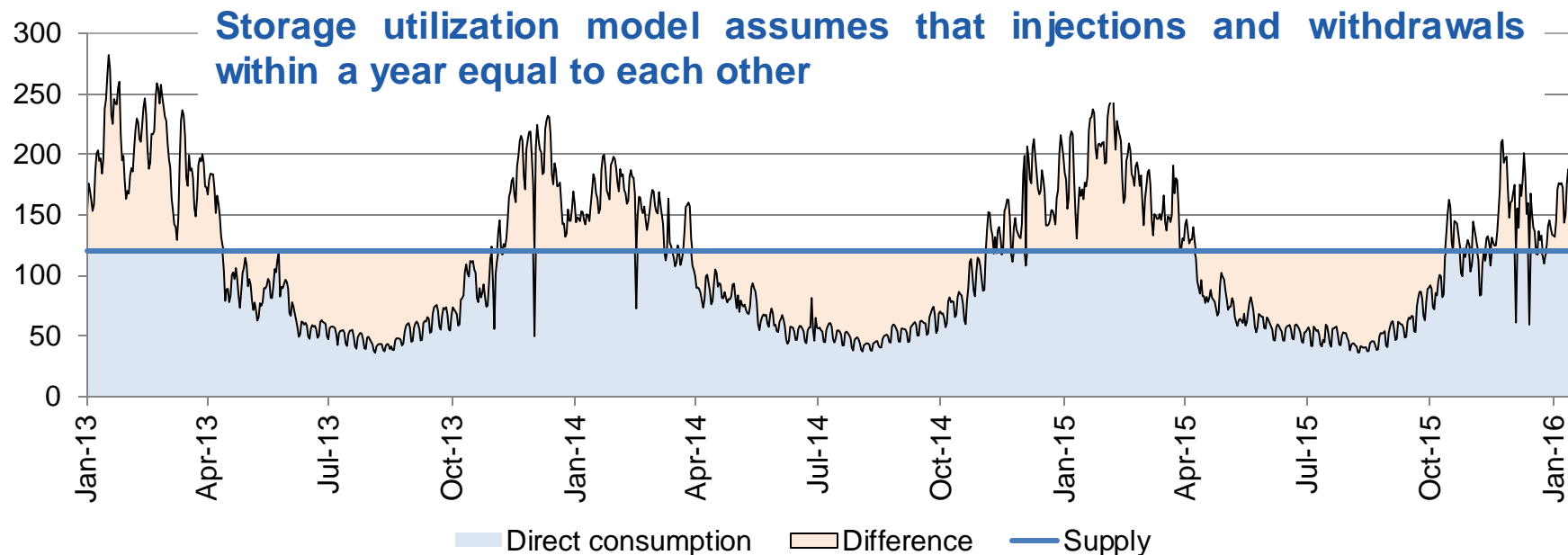
Value of Seasonal Flexibility: UGS Tariffs Increased Slightly (1)



1. Prices increased slightly
2. Minimum volume offered decreased in order to attract smaller clients
3. Aggregators are able to book capacity at lower rates (discounts on volume, auctions)

Prices for 2014-2016, upd. January 2016

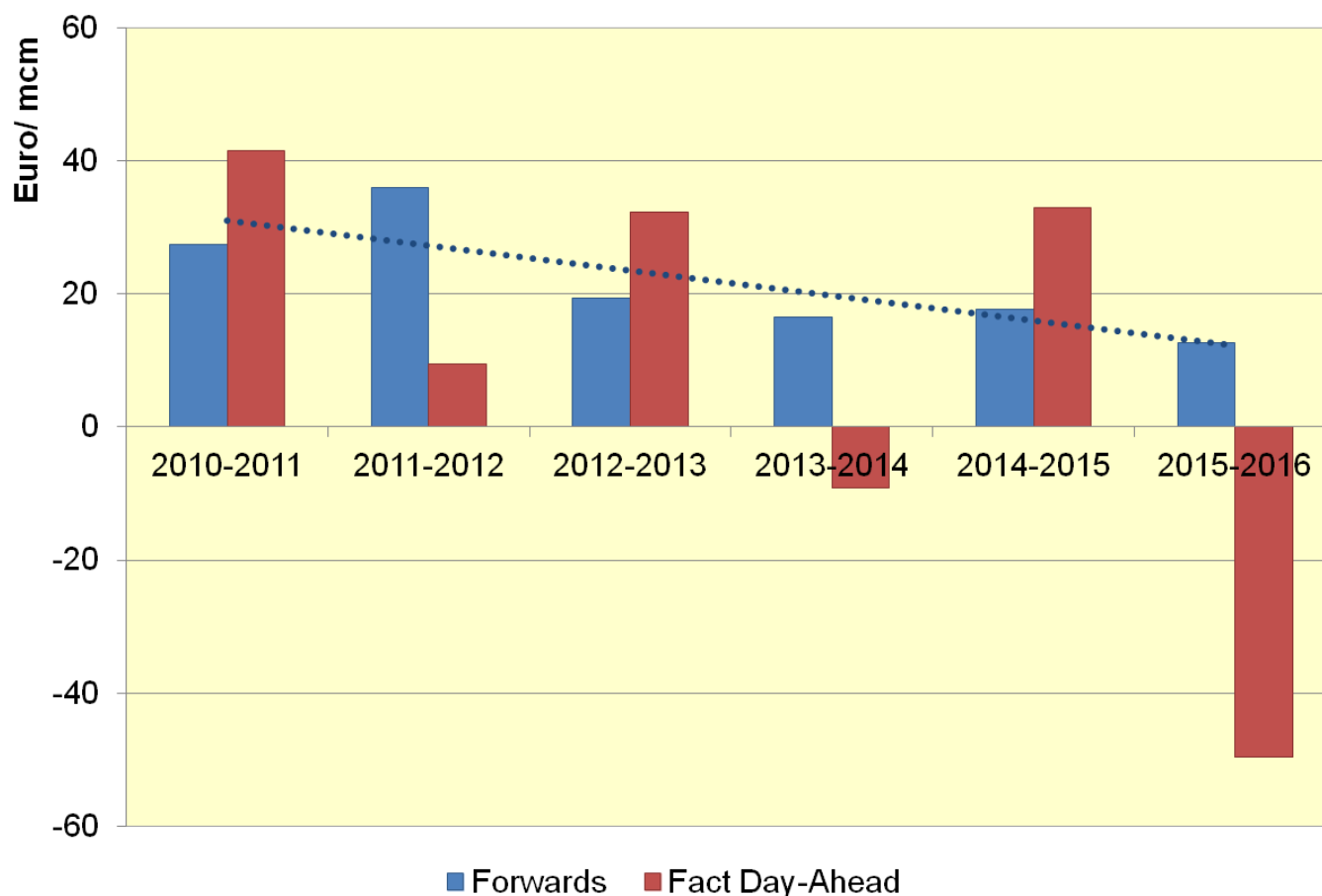
Value of Seasonal Flexibility: Consumption Profile Still Shows Strong Seasonal Variation (2)



Countries	Storage requirements ranking	Upper limit, %	Lower limit, %	Upper limit, Euro/ mcm	Lower limit, Euro/ mcm
France	I	49	24	27	13
Netherlands	II	33	16	18	9
Germany	II	30	15	16	8
Italy	II	33	16	18	9
UK	III	22	14	12	8
Spain	III	25	23	14	13
Average	-	32	18	17	10

Value of Seasonal Flexibility: But Market Prefers to Evaluate Cost of Storage on Seasonal Forward Spread (3)

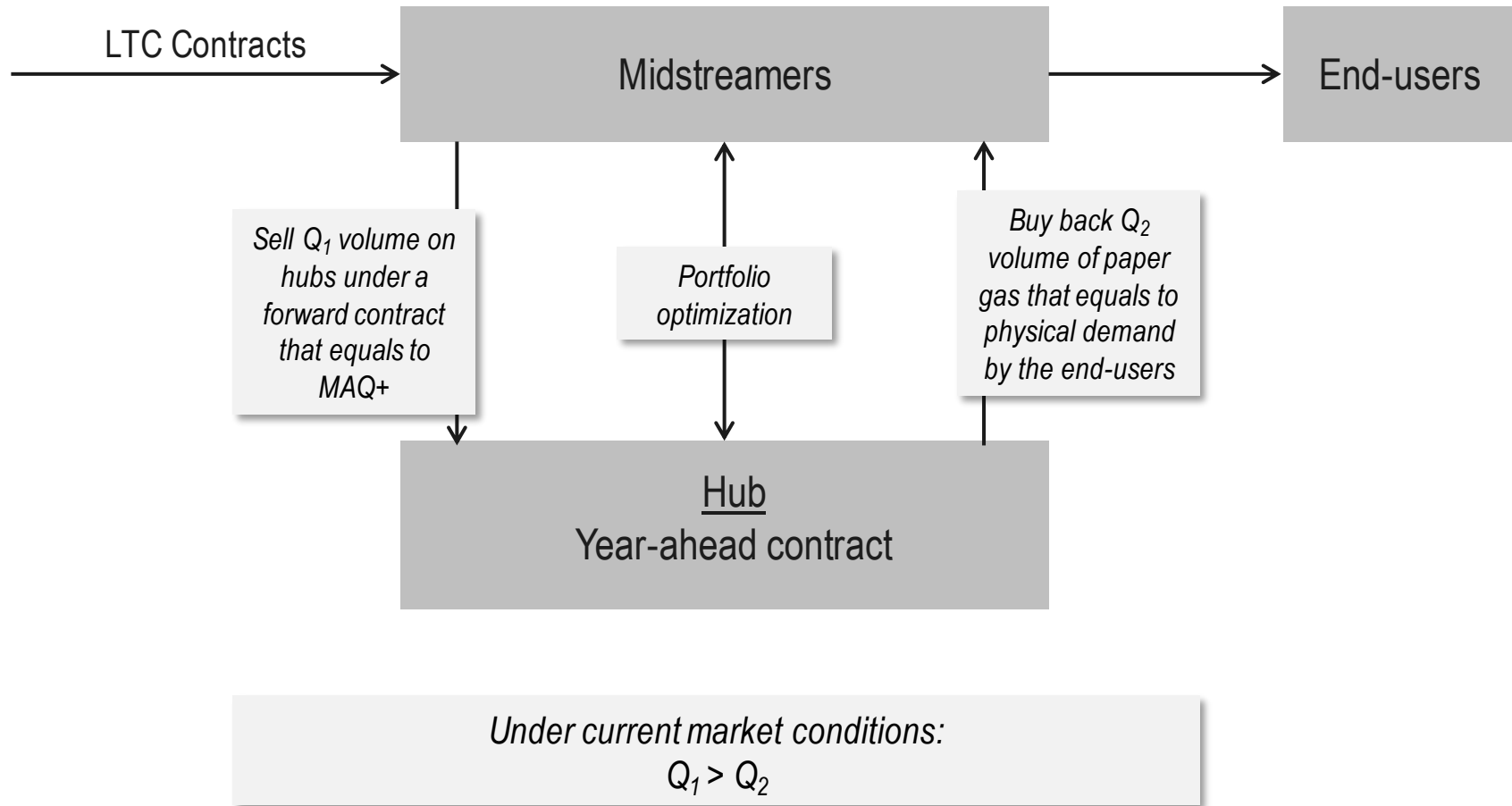
Comparison of seasonal spreads forwards and actual day-ahead prices



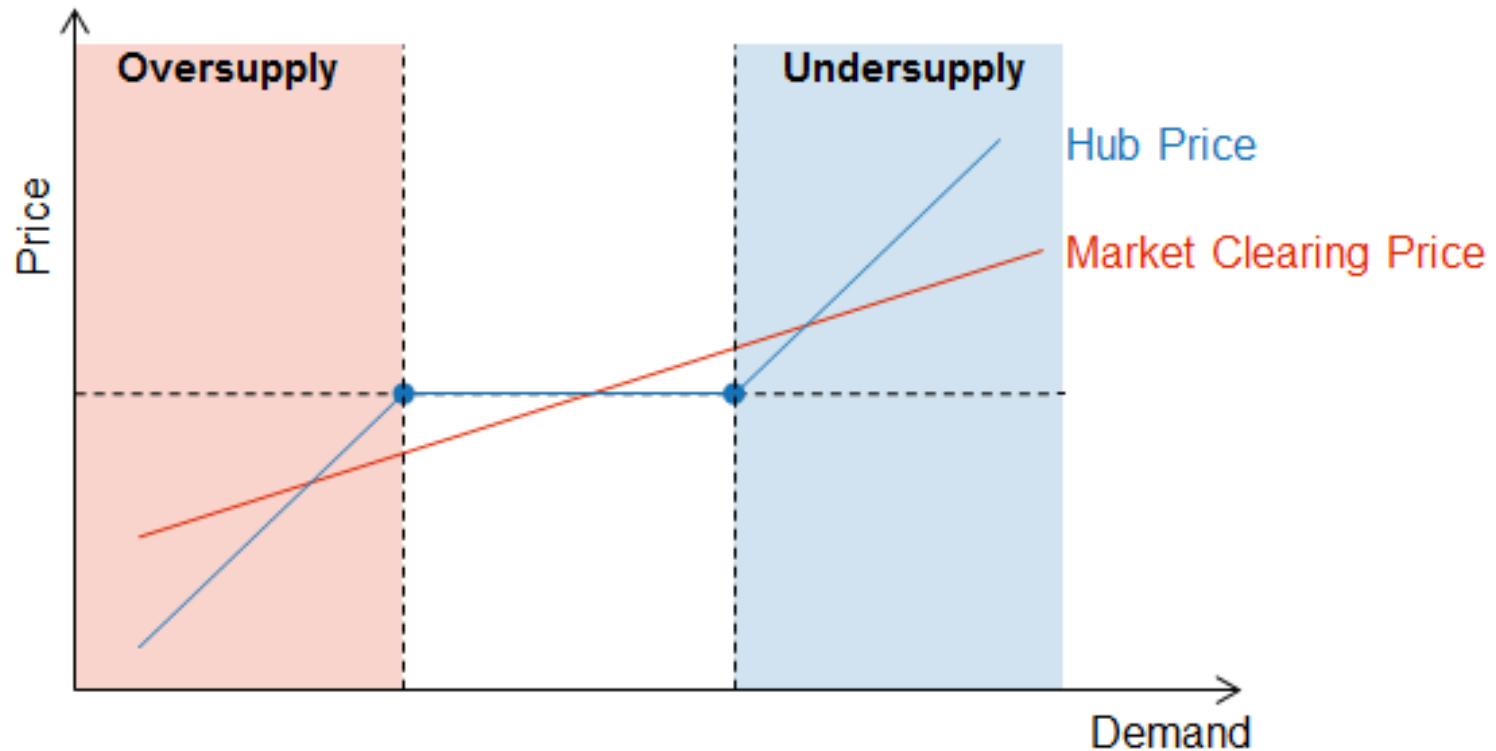
That method is incorrect because it leads to economically ridiculous assessment of the price of flexibility: real cost of storage becomes negative.

Source: Bloomberg

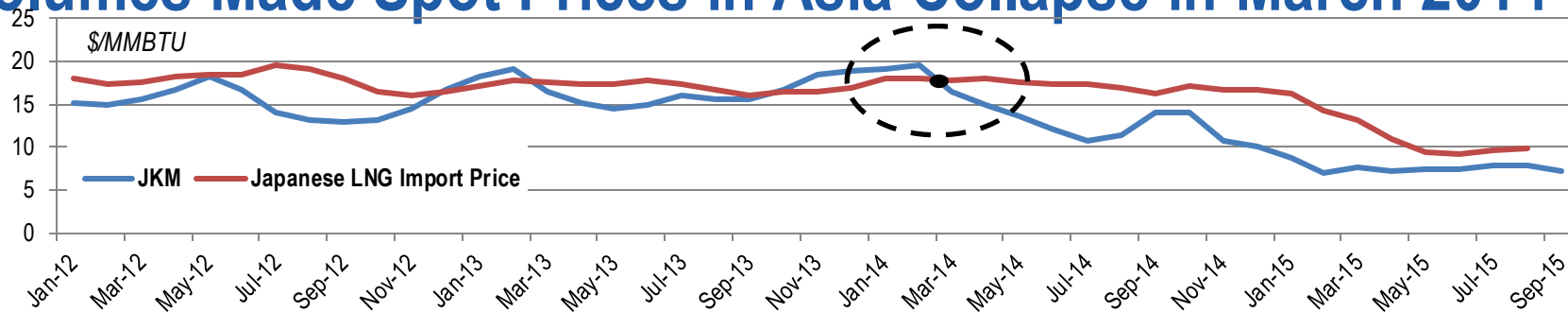
Value of Seasonal Flexibility: Midstreamers Optimize Volumes via Hubs and Underestimate Value of LTC Flexibility (4)



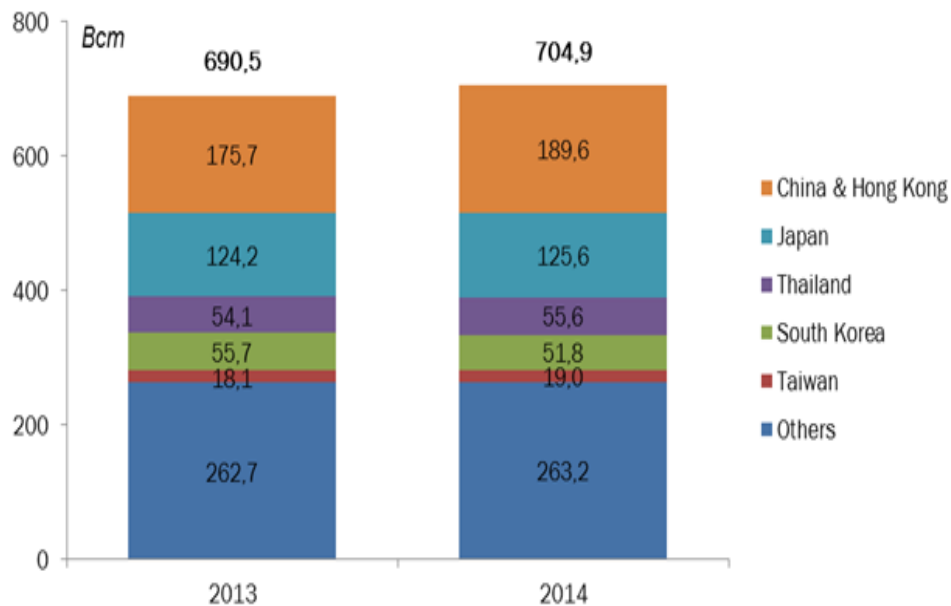
Hub Prices Overreact when the Market is in 'Oversupply' or in 'Undersupply'



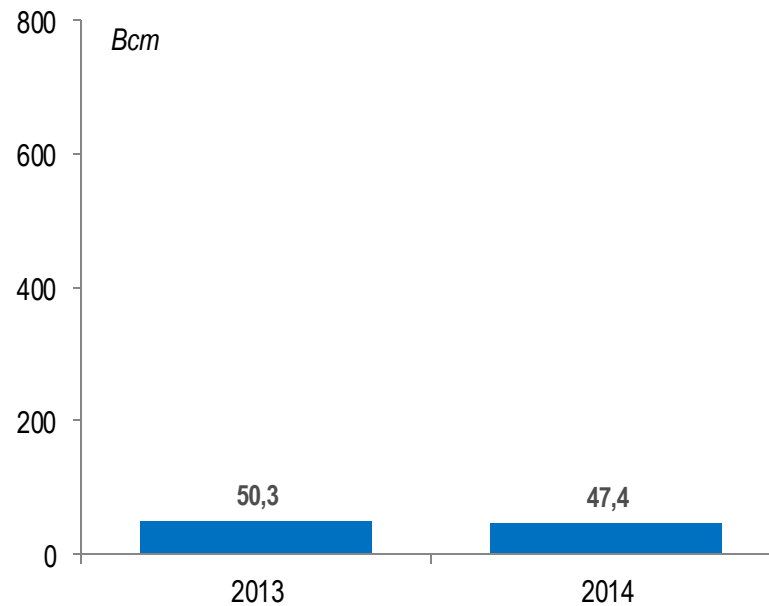
'Homeopathic' Reduction of Demand for Uncontracted Volumes Made Spot Prices in Asia Collapse in March 2014



Gas Consumption in Asia



Spot and Short-Term Trade* in Asia



* Contracts of a duration of 2 years or less

Conclusions

- In OECD Europe rational for oil-indexation in gas pricing still holds due to strong competition between natural gas and oil products in industry and commercial and residential sector. There are no indications that it will discontinue in the foreseeable future.
- In transportation sector competition between natural gas and oil products is only emerging but has strong potential for growth
- Flexibility in LTC volume nomination provide a buyer with arbitrage opportunities between contract and hub prices. Premium for arbitrage is now less noticeable as prices have converged
- While end-users need flexible supplies due to remaining seasonality in demand, midstreamers underestimate its value as they optimize volumes via hubs that undermines storage business viability in EU
- Hub prices are not an indication of the total supply and demand for Europe but for the residual volumes left when the bulk of demand is met with the LTCs
- Thought total demand for gas in Asia increased, 'homeopathic' reduction of demand for uncontracted volumes made spot prices in Asia collapse in March 2014



THANK YOU FOR YOUR ATTENTION!